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South; and varieties of soy beans and the oriental timber and edible bamboos of Japan, which are now represented by groves in various parts of the south, were also secured.

#### HONORARY DEGREES AT YALE UNIVERSITY

At the recent commencement of Yale University the degree of doctor of science was conferred on Dr. H. P. Armsby and the degree of master of arts on Dr. William Darrach, Professor H. E. Hawkes and Mr. E. W. Nelson. In conferring these degrees President Hadley said:

**HENRY PRENTISS ARMSBY:** A graduate of the Sheffield Scientific School in 1874, specializing in chemistry; doctor of philosophy at Yale, 1879; for several years he was associated with that admirable institution, the Connecticut Agricultural Experiment Station. He has been a teacher in various universities; he is a leading authority on animal nutrition at Pennsylvania State College. He is now director of the Institute of Animal Nutrition at Pennsylvania State College. After the signing of the armistice, he was chosen to go abroad in the commission concerned with food problems in Europe. His career has been a multitudinous blessing.

**WILLIAM DARRACH:** Was graduated from Yale College in 1897; member of Phi Beta Kappa; took the degree of M.A. and M.D. at Columbia; is now dean of the medical faculty at the College of Physicians and Surgeons. He was attached to Base Hospital No. 2, with commission as captain, and sailed for France in May, 1917; was advanced to the rank of colonel in 1919, and became senior consultant in surgery at headquarters. His publications in scientific research are important. He is a surgeon, a scholar, a teacher and a patriot.

**HERBERT EDWIN HAWKES:** B.A., Yale, 1896; Ph.D., 1900; like many of his classmates, Dr. Hawkes became a member of the Yale faculty, and taught mathematics for twelve years. In 1910 he was called to Columbia as professor; he was such a conspicuous success in administration that he was made dean of the college. He is the author of books in his chosen field, but his chief distinction is a worker of miracles—he has made hundreds of young men love mathematics. Perhaps they would not love mathematics so much if they did not love him even more. A living force in education.

**EDWARD WILLIAM NELSON:** A distinguished naturalist and one of the first ornithologists in the

world. He has been on scientific expeditions in the Arctic and Torrid Zones, and is at home everywhere. He was in Alaska in 1877, with the expedition in search of the Jeanette in 1881, and has spent many years of scientific conquest in Mexico. He has published authoritative monographs on the birds of Bering Sea and on the squirrels of Central America. He is chief of the Biological Survey in the U. S. Department of Agriculture. During the war, he was constantly employed, and he discovered the best method of ridding the trenches of undesirable visitors; thus making the study of natural history contributory to social science. He leaves for Alaska to-day.

The degree of doctor of laws was conferred on Sir Auckland Campbell Geddes, member of British Parliament, formerly professor of anatomy, British ambassador to the United States.

#### SCIENTIFIC NOTES AND NEWS

THE Albert medal of the Royal Society of Arts has been awarded to Dr. A. A. Michelson, professor of physics in the University of Chicago.

**DR. EDGAR F. SMITH,** retiring provost of the University of Pennsylvania, after conferring degrees and giving the commencement address, received from Dr. William Pepper, dean of the medical school, the doctorate of medicine, conferred at the special request of the faculty of the school of medicine.

**HARVARD UNIVERSITY** has conferred its doctorate of science on Dr. W. W. Keen, of Philadelphia, and Dr. H. M. Biggs, of New York.

THE doctorate of science has been conferred by Tufts College on Dr. Arthur B. Lamb, professor of chemistry at Harvard University.

THE degree of master of science was conferred on Major Edward Hall Bowie, forecaster, U. S. Weather Bureau, at the commencement of St. John's College.

THE semi-centennial celebration of Iowa State College was held in connection with commencement in June this year, having been delayed nearly two years on account of the war. Four hundred and thirty-five degrees were awarded. No honorary degrees had been given in recent years. Thirteen were conferred

in connection with the semi-centennial celebration, as follows: Doctor of Science to J. C. Arthur, Purdue University; Alfred Atkinson, Montana Agricultural College; Carleton Roy Ball, Washington, D. C.; Isabel Bevier, University of Illinois; Eugene Davenport, University of Illinois; A. S. Hitchcock, Washington, D. C.; L. S. Klinck, University of British Columbia; John R. Mohler, Washington, D. C.; Wilmon Newell, Gainesville, Fla.; R. A. Oakley, Washington, D. C. Doctor of Engineering to W. C. Armstrong, St. Paul, Minn.; A. P. Davis, Washington, D. C.; Thomas L. Smith, Milwaukee, Wis.

MAJOR GENERAL WILLIAM G. GORGAS, former surgeon-general of the United States Army, has been obliged to abandon his mission to West Africa, where he was going to investigate sanitary conditions. Other members of the party, headed by Brigadier General Robert E. Noble, U. S. Army, will proceed thither on June 30. General Gorgas recently suffered in London a stroke of apoplexy, which affected the left side. His condition is still serious and it is planned that he shall return to the United States when he is able to travel.

IN its account of the Imperial Entomological Conference held in London from June 1 to 11 *Nature* says: "Much gratification was felt and expressed at the presence for the first two days of Dr. L. O. Howard, entomologist of the U. S. Department of Agriculture. His brief, pointed remarks at some of the discussions were much appreciated; he deplored some recent attempts to destroy 'entomology' as a specific economic subject by dividing its subject-matter between 'parasitology' and 'phytopathology.'"

DR. C. G. ABBOT, assistant secretary of the Smithsonian Institution, has gone to Arizona to supervise the setting up of a solar observing station in the Haqua Hala Mountains.

PROFESSOR LEWIS KNUDSON, of the College of Agriculture, has returned to Ithaca after a stay of several months in France and Spain. At the request of the Spanish government he visited Madrid and Barcelona, at the Natural Museum of Science he organized a depart-

ment of plant physiology and gave a course of lectures and conducted a laboratory.

BRIGADIER GENERAL M. T. FINNEY, Colonel John B. Walker and Lieutenant Colonels Robert H. Ivy and Murray S. Danforth, Medical Reserve Corps, have been ordered to Paris, France, for duty at the coming inter-allied surgical conference.

DR. SEYMOUR HADWEN has resigned his position as chief pathologist in charge of the biological laboratory, Health of Animals Branch, Canadian Department of Agriculture, Ottawa, Canada, and has taken a position as chief pathologist in the Reindeer Investigations of the Bureau of Biological Survey, U. S. Department of Agriculture. His headquarters are Unalakleet, Alaska.

DR. N. E. DORSEY, physicist of the Bureau of Standards, has resigned in order to go into consulting and testing work.

C. H. KIDWELL, chief of the Water Resources Laboratory of the U. S. Geological Survey, has resigned to accept a position with the Solvay Process Company at Syracuse.

CEPHAS HEMPSTONE SINCLAIR, hydrographic and geodetic engineer in the U. S. Coast and Geodetic Survey, died on May 16, in his seventy-third year.

LEONARD DONCASTER, F.R.S., fellow of King's College, Cambridge, and Derby professor of zoology in the University of Liverpool, died on May 28, in his forty-third year.

DR. F. KÖLPIN RAVN, the Danish plant pathologist, died on May 24, at Orange, New Jersey, while on a visit to the United States.

THE U. S. Civil Service Commission announces an open competitive examination on July 27, for psychological investigator in employment tests to fill vacancies in the Bureau of Efficiency, at salaries of \$3,000 to \$4,000 a year. The position is open to both men and women. Candidates will not be required to report for examination, but will be rated on education, experience and a thesis.

THE following officers and members of council of the Royal Astronomical Society were elected at the anniversary meeting on Feb-

ruary 13: *President*: Professor A. Fowler. *Vice-presidents*: Sir F. W. Dyson, Professor A. S. Eddington, Major P. A. MacMahon and Professor H. F. Newall. *Treasurer*: Mr. E. B. Knobel. *Secretaries*: Dr. A. C. D. Crommelin and the Reverend T. E. R. Phillips. *Foreign Secretary*: Professor H. H. Turner. *Council*: Professor A. E. Conrady, Dr. J. L. E. Dreyer, Dr. J. W. L. Glaisher, Mr. J. Jackson, Dr. Harold Jeffreys, Mr. H. S. Jones, Professor F. A. Lindemann, Mr. E. W. Maunder, Dr. W. H. Maw, Professor J. W. Nicholson, Mr. J. H. Reynolds and Lieutenant-Colonel F. J. M. Stratton.

THE members of the Sigma Xi at Northwestern University celebrated on April 20 the one hundredth anniversary of the discovery of the first connection between electric currents and magnetism, made by H. C. Oersted at Copenhagen, a discovery which forms one of the two foundation stones upon which rest our modern electrical industries and wireless communication. President Lynn Harold Hough made some introductory remarks, and Mr. Walter Clyde Jones gave an address on "The Significance of Oersted's Work," which was followed by a conversazione in the laboratory.

A motion picture illustrating the College Experimental Station Bulletin entitled "Life History and Control of the Pocket Gopher of the Willamette Valley," by H. M. Wight, was a feature of the annual open meeting of the Biological Club at the Oregon Agricultural College on April 22. One reel was shown depicting the destructive habits of the gopher on farm land and methods for control. This picture was prepared by H. M. Wight, author of the bulletin, assisted by D. K. Mereen, who conducted all the photographic work, and Mr. J. M. Clifford, of the Experimental Station, who supplied the titles. The program of the evening included an illustrated lecture on "Natural Vegetation as an Indicator of Land Capabilities" by Professor W. E. Lawrence. The regular meetings of the Biological Club are held on the third Tuesday of the month.

ANNOUNCEMENT is made by the American Museum of Natural History of a gift by Frederick F. Brewster, of New Haven, Connecticut, of 3,200 specimens of land-birds collected in the West Indies and South America by Rollo H. Beck, under the direction of Dr. Leonard C. Sanford. A large part of this material, according to Dr. Frank M. Chapman, curator of the department of birds, is new to the museum's collections, and much of it is contained in no other museum. The collection includes 1,500 birds from the West Indies chiefly the high mountains of Santo Domingo, from which little-known area there is included a series of the recently discovered Crossbill and Patagonia Sparrow, known heretofore only from a few specimens in the National Museum in Washington; a large series of two distinct new species, known only in the Brewster collection; and the unique type of a new genus of Goatsuckers. There are also 500 birds from Bahia, and somewhat over a thousand specimens from the extreme southern part of South America, including a representative series from Tierra del Fuego and the Falkland Islands, from which localities the museum was wholly without material.

It is noted in *Nature* that a meeting has been held in Brussels of the scientific committee of the Solvay International Institute of Physics, and it was resolved, upon the recommendation of the executive committee, to resume the work of the institute, which had been interrupted by the war. New physical councils will be summoned from time to time, similar to those formed in 1911 and 1913. The president referred to the debt which the scientific committee owed to Dr. R. B. Goldschmidt, of Brussels, for the services rendered by him to the institute during the early years of its foundation. The members of the committee were Professor H. A. Lorentz (president), Haarlem; Mme. Curie, Paris; Sir W. H. Bragg, London; M. Brillouin, Paris; Professor H. Kamerlingh Onnes, Leyden; Professor Knudsen, Copenhagen; Professor A.

Righi, Bologna; Sir Ernest Rutherford, Cambridge; and Professor E. Van Aubel, Ghent.

#### UNIVERSITY AND EDUCATIONAL NEWS

YALE UNIVERSITY has received from an unnamed graduate a gift of \$3,000,000 to the general endowment of the university, contingent upon additional gifts of \$2,000,000 by next January, exclusive of those through the alumni university fund. The gift is made to meet increased faculty salaries.

CORNELL UNIVERSITY has received a gift of \$500,000 from Mr. August Heckscher, of New York City, for the endowment of research. The income of the fund created by Mr. Heckscher's gift will be used to maintain research professorships and to provide facilities for scientific work.

PROFESSOR FRANKLIN MOON, who has held the chair of forest engineering since 1912, has been elected dean of the New York State College of Forestry at Syracuse.

DR. EDWARD BARTOW, chief of the Illinois State Water Survey Division, has been elected head of the department of chemistry of the Iowa State University.

DR. H. E. WELLS, formerly professor of chemistry at Washington and Jefferson College, has been appointed professor of chemistry at Smith College.

PROFESSOR HORACE GUNTHORP, of the department of zoology and physiology at Washburn College, has accepted an assistant professorship of zoology in the University of Washington, at Seattle.

DR. H. M. DAWSON has been selected to be the occupant of a newly established chair of physical chemistry at the University of Leeds.

#### DISCUSSION AND CORRESPONDENCE

##### ORTHOGENESIS AMONG FISHES

IN tracing successions of fishes, extinct and recent, we observe the outlines of a law or generalization, still vaguely understood, which seems to be in line with Eimer's conception of

orthogenesis. This is defined as the doctrine that the phylogenetic evolution of organisms takes place systematically in a few definite directions, as contrasted with irregular divergence in many directions.

The facts in brief are these: In certain groups some particular structure will acquire a high degree of development and specialization; this being pursued along what might seem to be a definite determinative line; after which, the structure, being over-developed, undergoes again progressive degeneration, sometimes being altogether lost.

Two series of fishes may illustrate that point: the rock fishes (*Scorpænidæ*), in their most primitive forms are very much like the different types of bass, the chief difference lying in the presence of a peculiar backward extension of the bone under the eye, forming what is called the suborbital stay, and the fact that the skull has spines on its upper surface. We have the elaboration of spines on the head, the elaboration of scales, forming ultimately a series of bony plates, the extension over the head of a coat-of-mail, the elevation of fins, and other modifications. These gradually fading away through the different categories of sculpins (*Cottidæ*), until we come to the sea-snails (*Liparidæ*). These still retain the suborbital stay, but have lost all the hitherto specialized qualities: there are no scales, the body is covered with thin movable skin; there are no spines anywhere on the head or fins, and the fins themselves are very small in size, largely enveloped in the soft flaccid skin.

Quite as remarkable is the process of evolution and transformation of the butterfly fishes (*Chaetodontidæ*). Beginning with forms like *Ephippus*, not very different from ordinary bass-like species, these fishes become specialized in very high fins, the reduction of the size of the gill opening and the development of brush-like teeth of the mouth. Passing on further we see the tail provided with bony structures, sometimes with a brush of spines like porcupine quills, sometimes with a sharp cutting lance in a sheath on either side. The scales grow smaller and rougher, the fins being however reduced in height and in